



Ch 17.1: Seasons

Be able to...

What causes seasons on Earth

Explain what an equinox and solstice are.

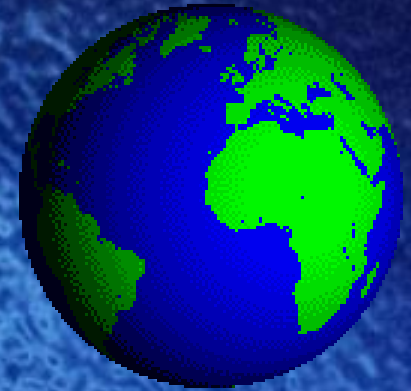
Earth's Motions

- What causes day and night on Earth?

- Earth rotates on its axis to give us day & night.

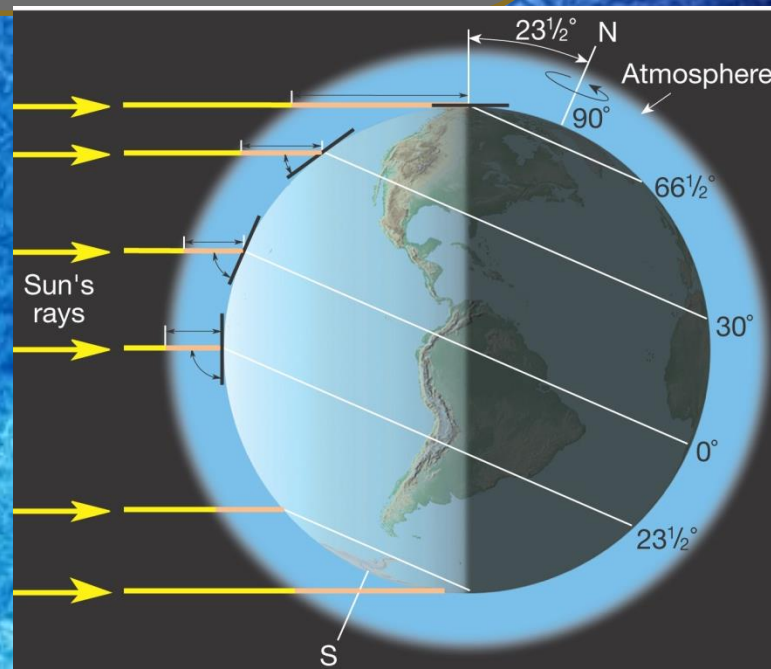
- What is a year equal to on Earth?

- Earth revolves around the sun.
 - Avg. distance from the sun is 93 million miles.
- Not a perfect circle orbit. (Elliptical)
- Earth is closest to the sun in our winter ~ Jan. 3rd
- Earth is the farthest away from the sun in our summer ~ July 4



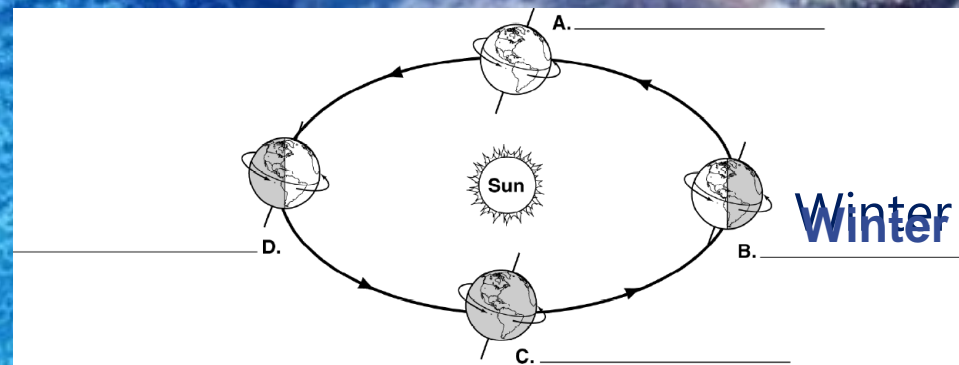
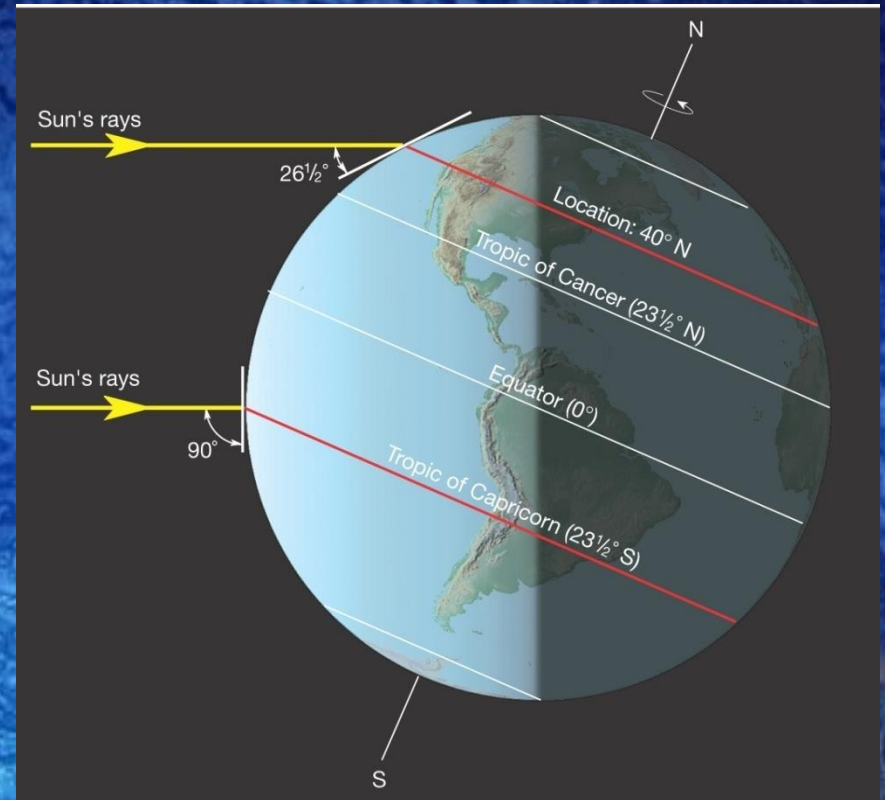
Earth's Seasons

- What causes seasons on Earth?
 - Earth's axis is tilted 23.5°
 - *(Only reason for the seasons.)*
 - **Earth has four seasons**
 - *Summer, Fall, Winter, & Spring*



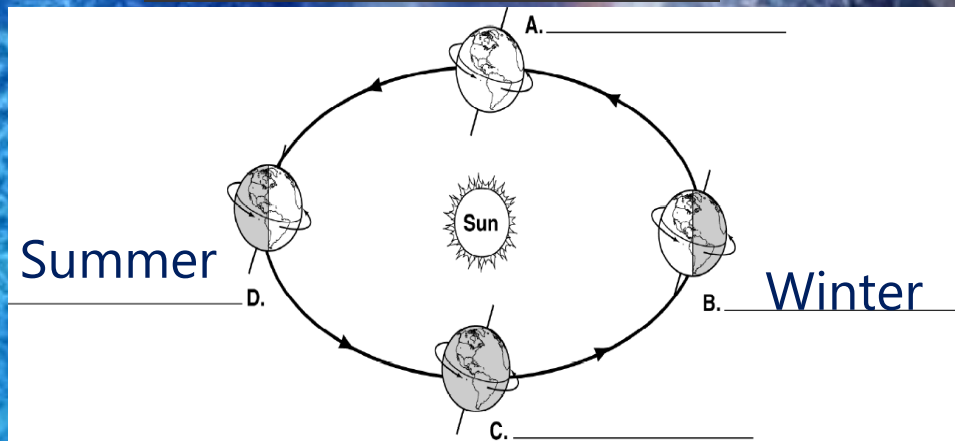
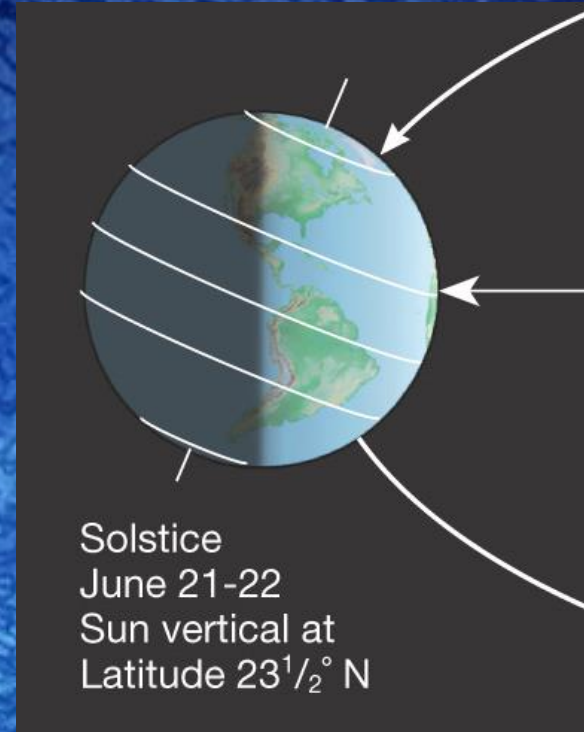
Winter Season

- Winter starts Dec. 20 or 23
- Northern Hemisphere is tilted away from the sun
 - Shortest daylight in the N.H.
 - Winter Solstice – 1st official day of winter
 - Wednesday, December 21, 2016 at 4:44 AM



Summer Seasons

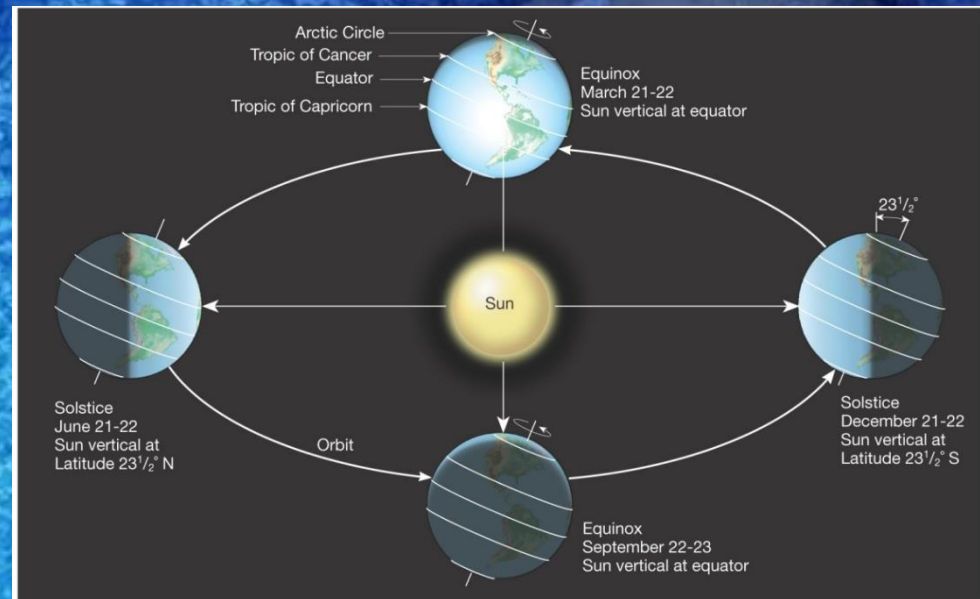
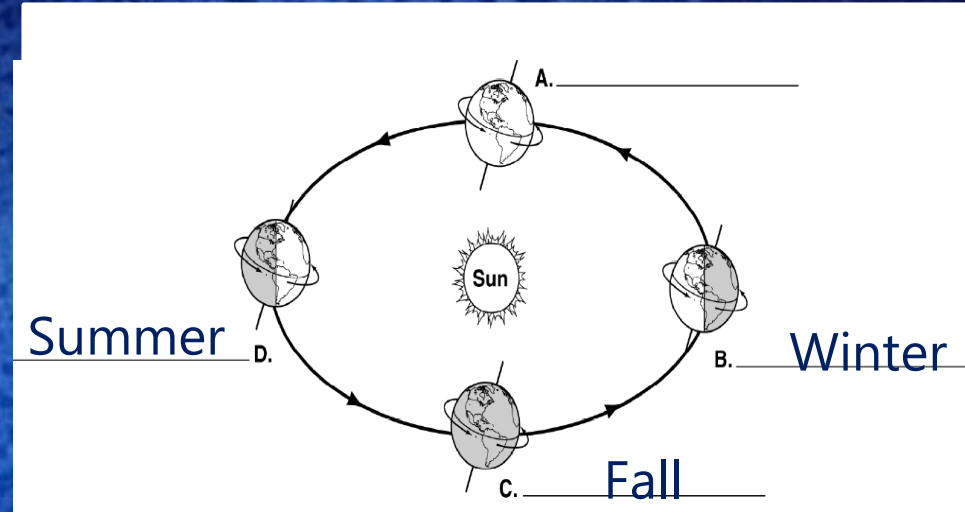
- Summer starts June 20 or 22
- N.H. is tilted toward the sun
 - Longest daylight of the year in the N.H.
 - **Summer Solstice** – 1st official day of summer
 - Tuesday, June 20, 2017 at 11:24 PM



Fall Season

- Sept 21 or 24

- Almost equal amount of sunlight for everyone (12hrs daylight, 12 darkness)
- The Sun is directly over the Equator
 - Autumnal (fall) equinox

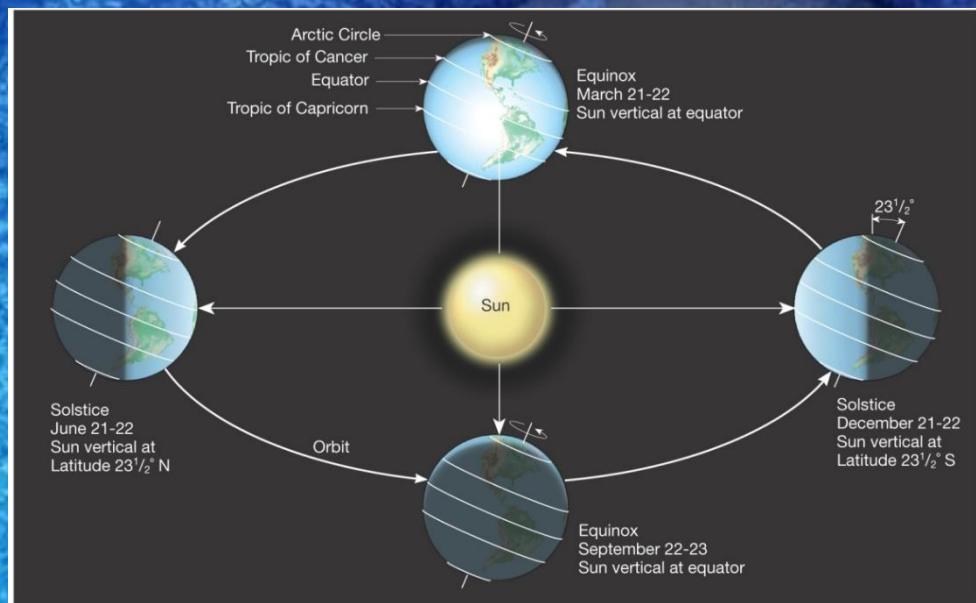
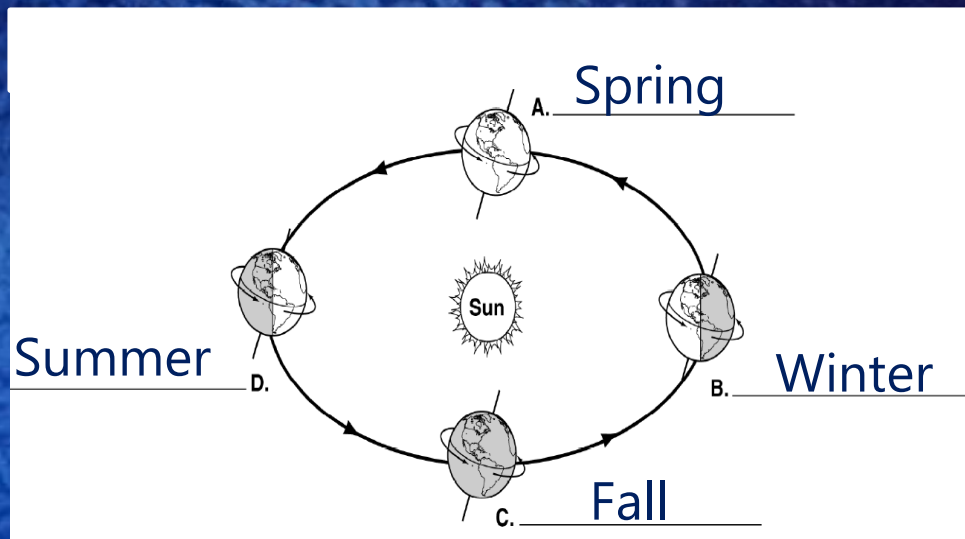


Spring Season

- March 20 or 21

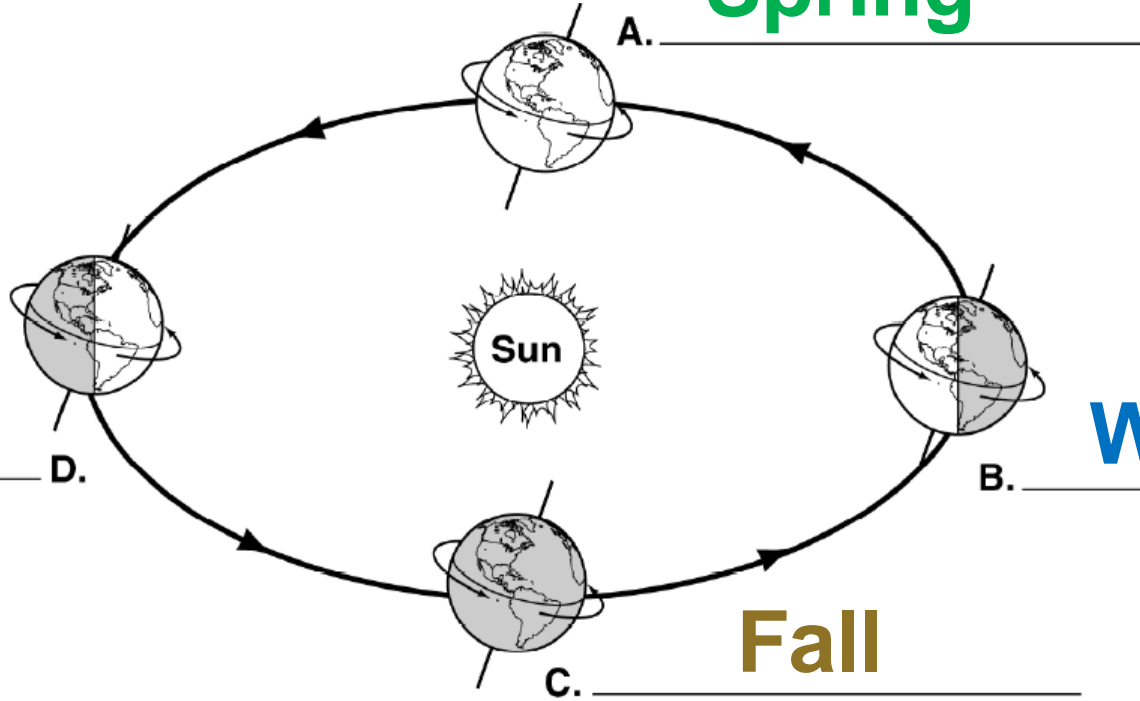
- Almost equal amount of sunlight for everyone (12hrs daylight, 12 darkness)
- The Sun is directly over the Equator

- Spring (Vernal) equinox



Which Earth represents Spring?

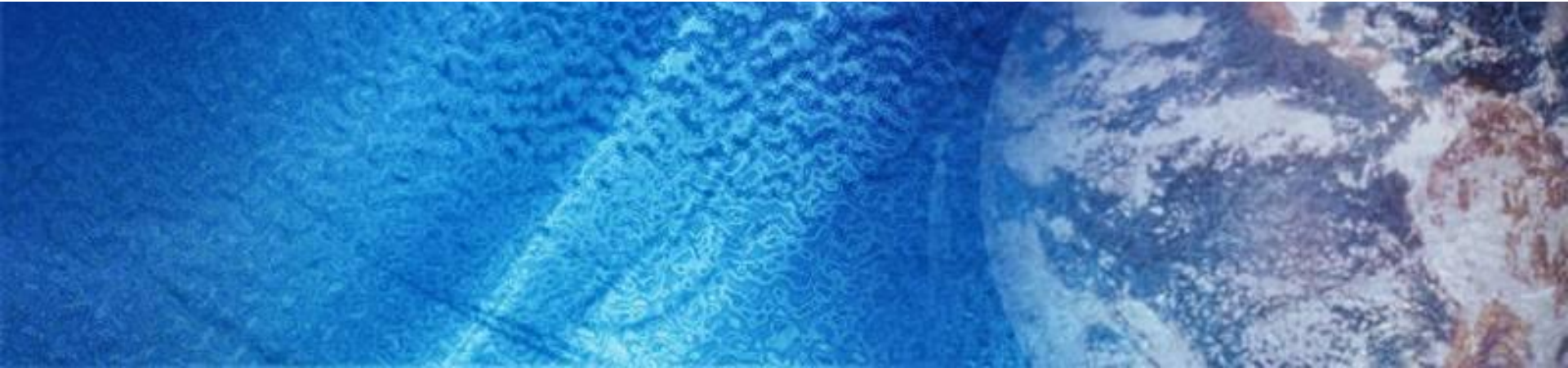
Spring



Summer

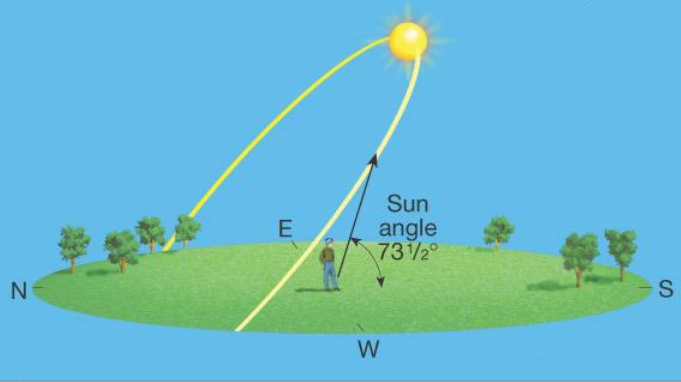
Winter

Fall



June 21-22

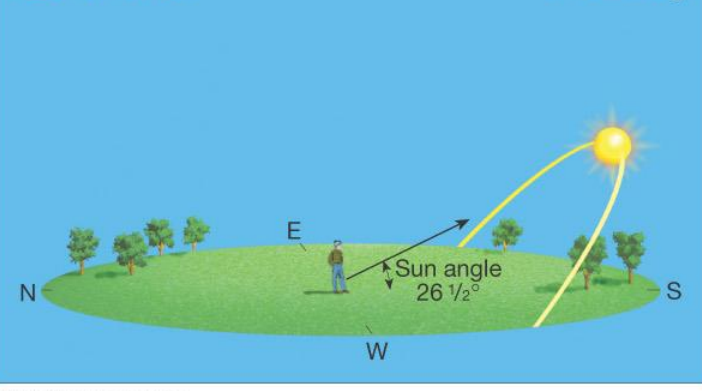
Longest day



(a) Summer solstice

December 21-22

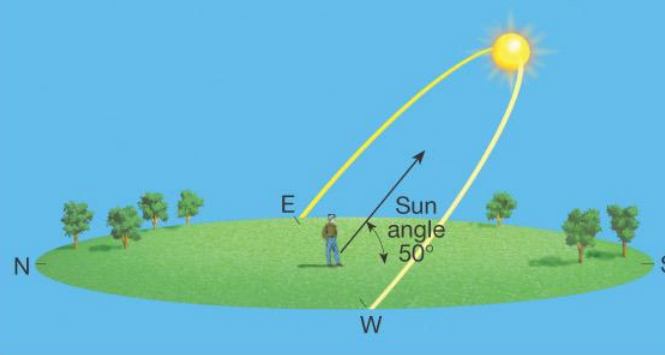
Shortest day



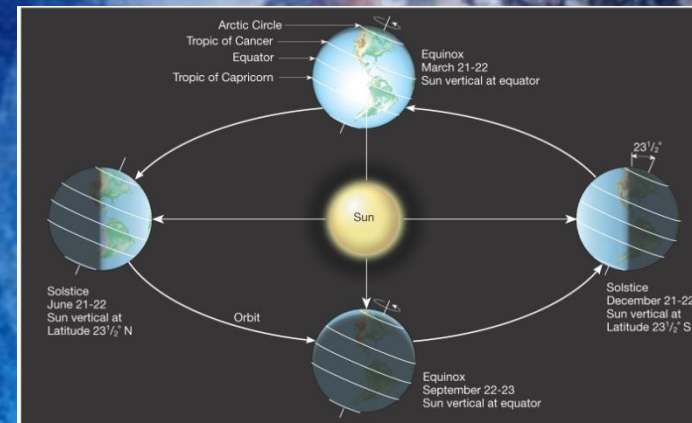
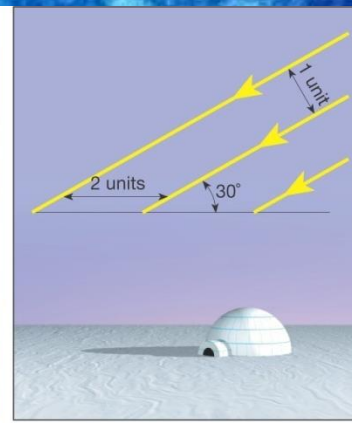
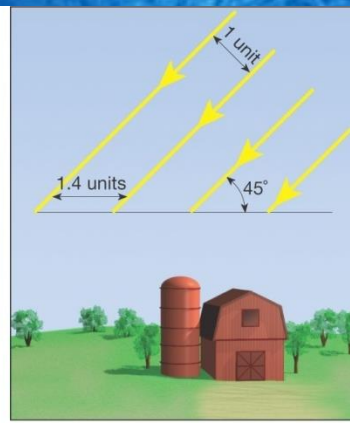
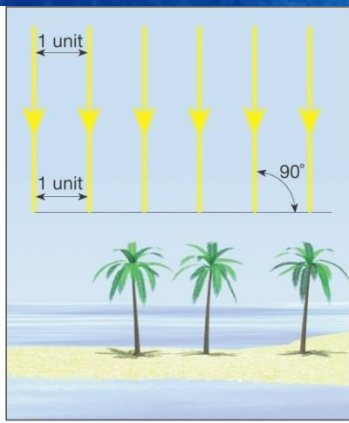
(c) Winter solstice

March 21-22
September 22-23

Day and
night equal



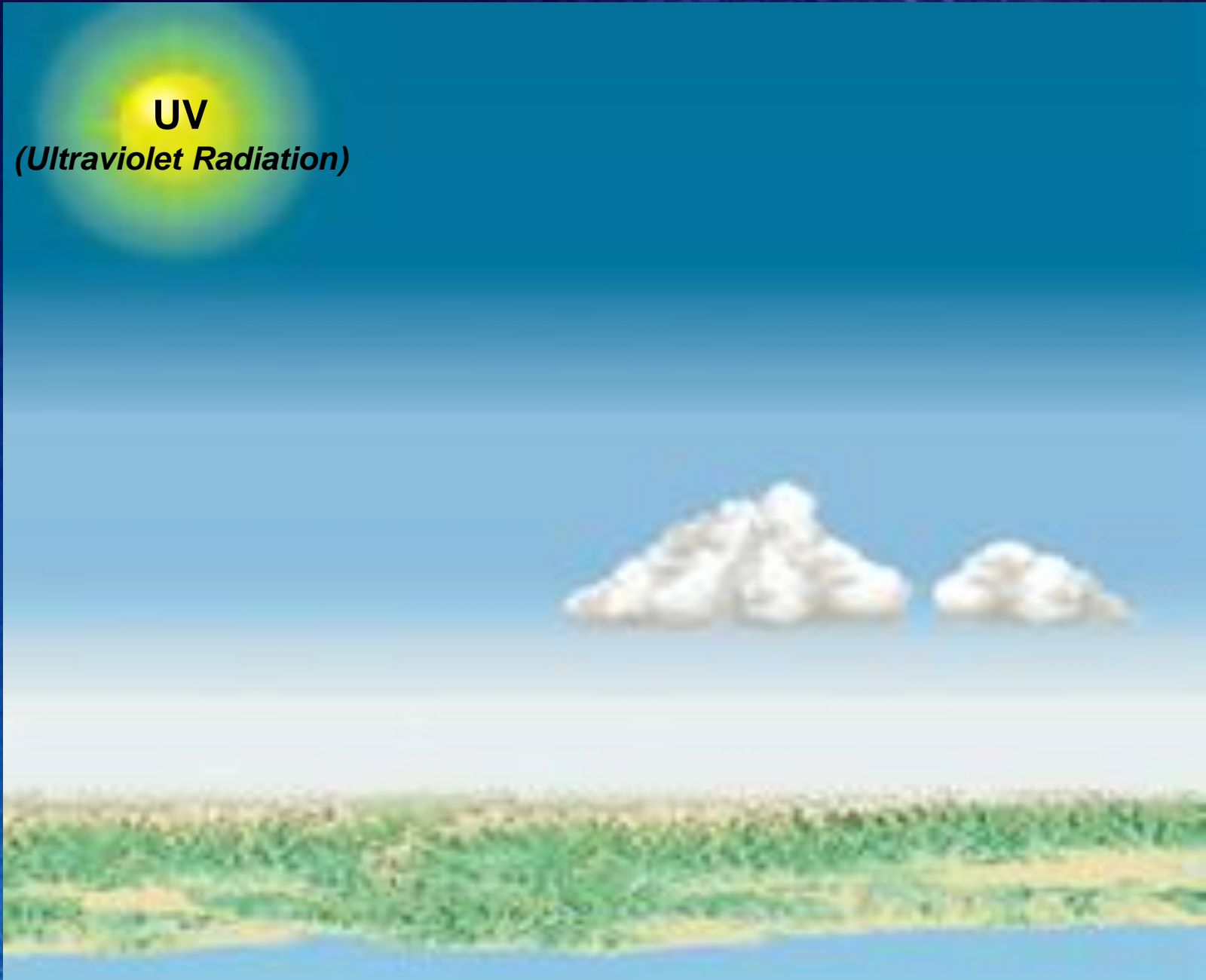
(b) Spring or fall equinox

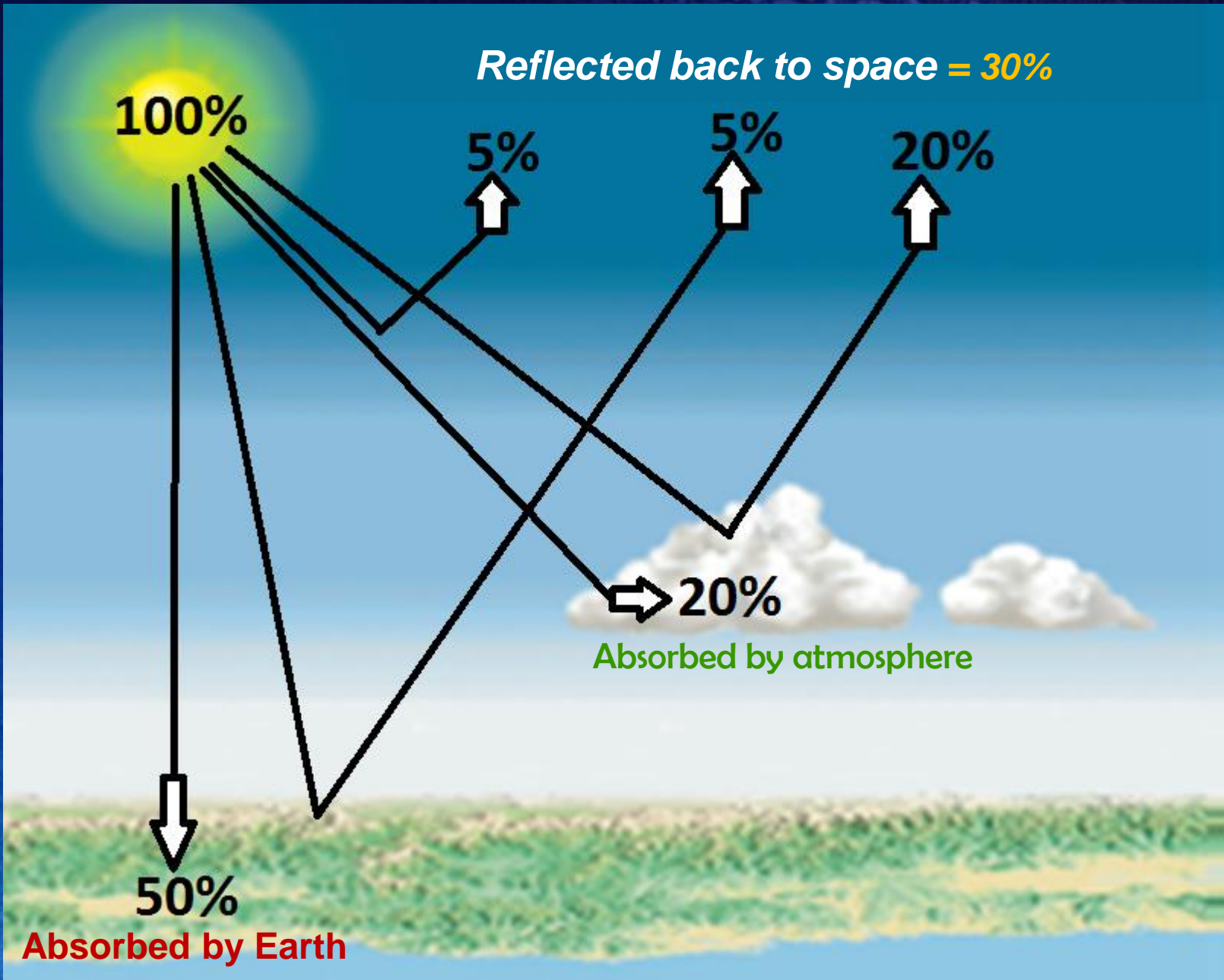


Solar Radiation / Earth's Heat Budget

UV

(Ultraviolet Radiation)





100%

5%

5%

20%

20%

Absorbed by atmosphere

50%

Absorbed by Earth

What causes the seasons?

Lesson Review

Write *true* if the statement is true. If the statement is false, change the underlined term to make the statement true.

False - longer

1. When the North Pole is tilted toward the Sun, the Northern Hemisphere has fewer daylight hours.

True

2. During winter, the combination of fewer daylight hours and less direct rays of the Sun causes lower temperatures.

True

3. When the Northern Hemisphere is tilted toward the Sun, it has summer.

True

4. The seasons are caused in part by the tilt of Earth's axis.

False - winter

5. During summer, the Sun's rays are less direct.

True

6. Direct rays produce more heat than indirect rays.

False - opposite

7. The seasons in the Northern Hemisphere and the Southern Hemisphere are the same.

Determining Hours of Daylight

The illustrations show the length of day at every 10° of latitude for the winter and summer solstices in the northern hemisphere. On each figure, begin at the equator, which has daylight hours of 12 hours and 0 minutes, and label every 10 degrees north and south of the equator to the 60° latitude north and south. Mark the final north and south latitude shown 66.5°. From this latitude to the poles, the daylight hours remain the same. Use the figures to help you answer the questions.

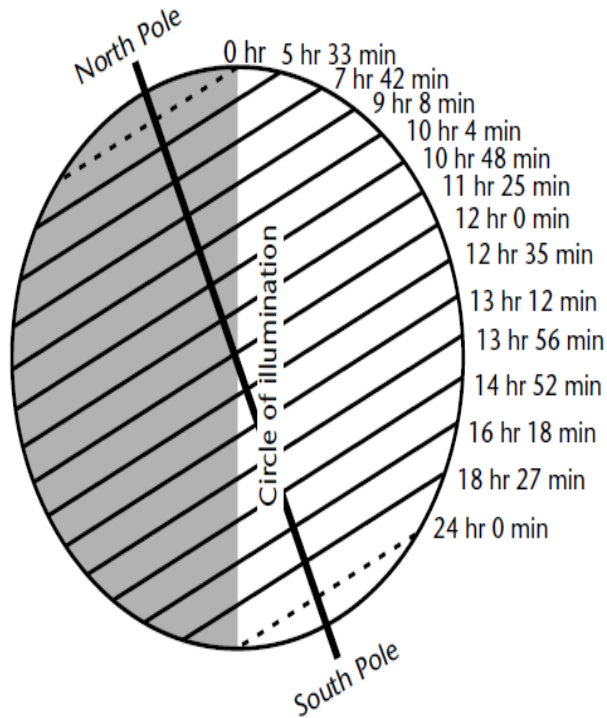


FIGURE 1

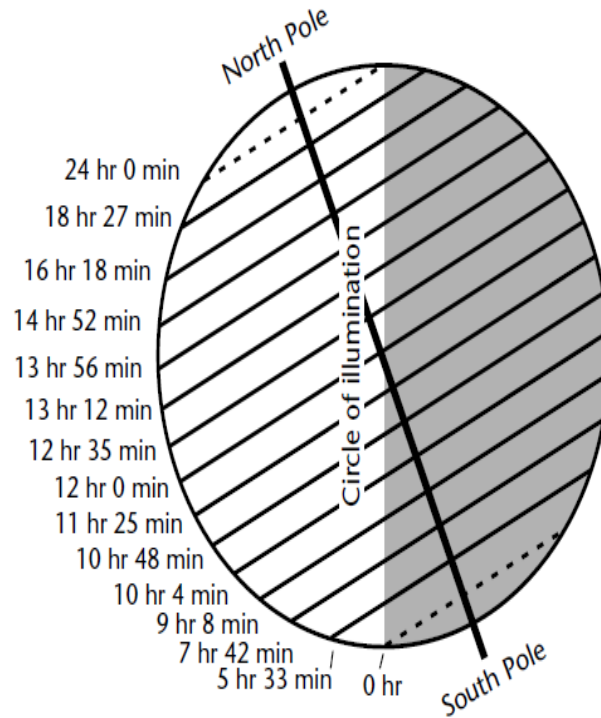
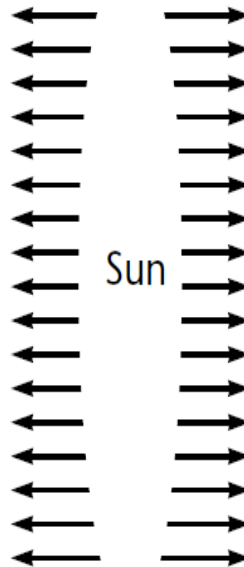


FIGURE 2

Determining Hours of Daylight

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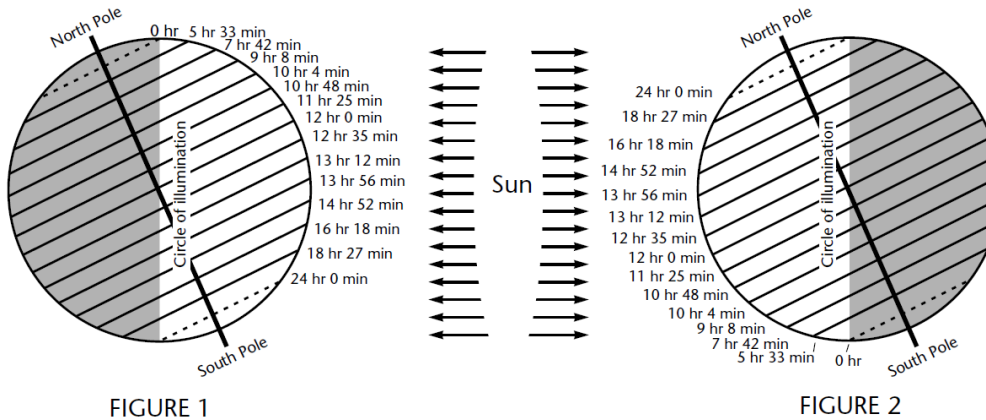


FIGURE 1

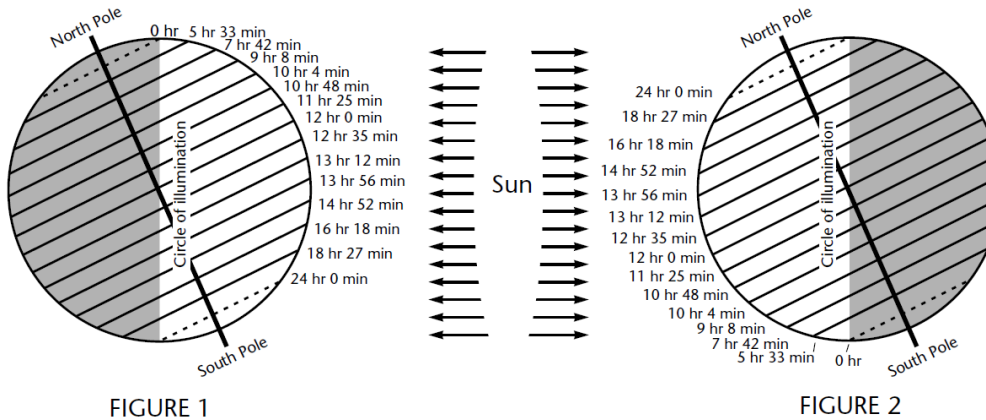
FIGURE 2

1. Which figure shows the summer solstice for the northern hemisphere? How do you know?

- **Figure 2 – Days are longer in the N.H. and The North Pole is tilted towards the sun.**

Determining Hours of Daylight

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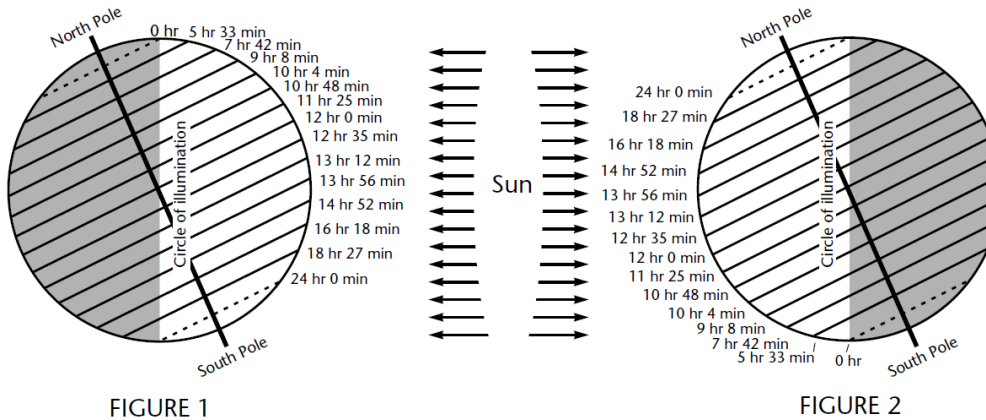


2. If you lived at 50° north latitude, how many hours of daylight would you have during the summer solstice? During the winter solstice? _____

- Summer = 16 hours and 18 minutes
- Winter = 7 hours and 42 minutes.

Determining Hours of Daylight

The illustrations show the length of day at every 10° of latitude for the winter and summer solstices in the northern hemisphere. On each figure, begin at the equator, which has daylight hours of 12 hours and 0 minutes, and label every 10 degrees north and south of the equator to the 60° latitude north and south. Mark the final north and south latitude shown 66.5°. From this latitude to the poles, the daylight hours remain the same. Use the figures to help you answer the questions.

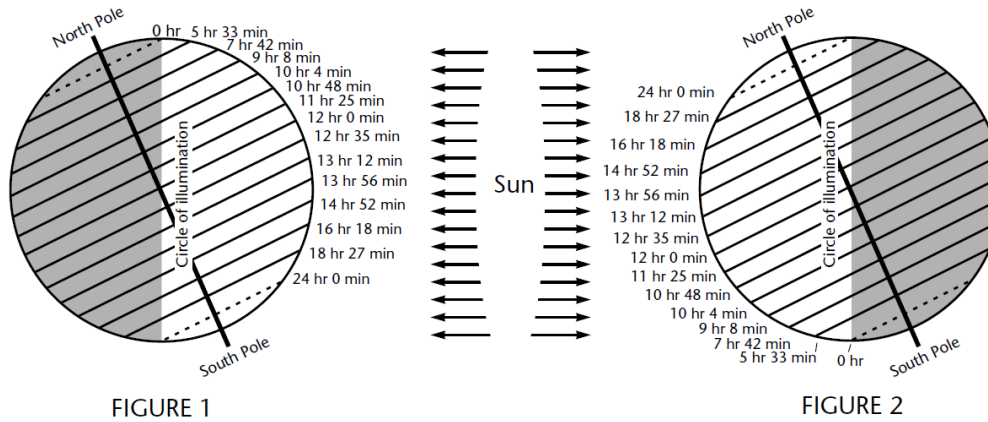


3. If the figures were used to show the summer and winter solstices in the southern hemisphere, which figure would show the summer solstice in the southern hemisphere? How do you know? _____

- Figure 1 – Shows days are longer in the southern hemisphere. The south pole is tilted towards the sun.

Determining Hours of Daylight

The illustrations show the length of day at every 10° of latitude for the winter and summer solstices in the northern hemisphere. On each figure, begin at the equator, which has daylight hours of 12 hours and 0 minutes, and label every 10 degrees north and south of the equator to the 60° latitude north and south. Mark the final north and south latitude shown 66.5°. From this latitude to the poles, the daylight hours remain the same. Use the figures to help you answer the questions.



4. If you lived at the north pole, how many daylight hours would you have at the summer solstice?
At the winter solstice? _____

- Summer = 24 hours
- Winter = 0 hours